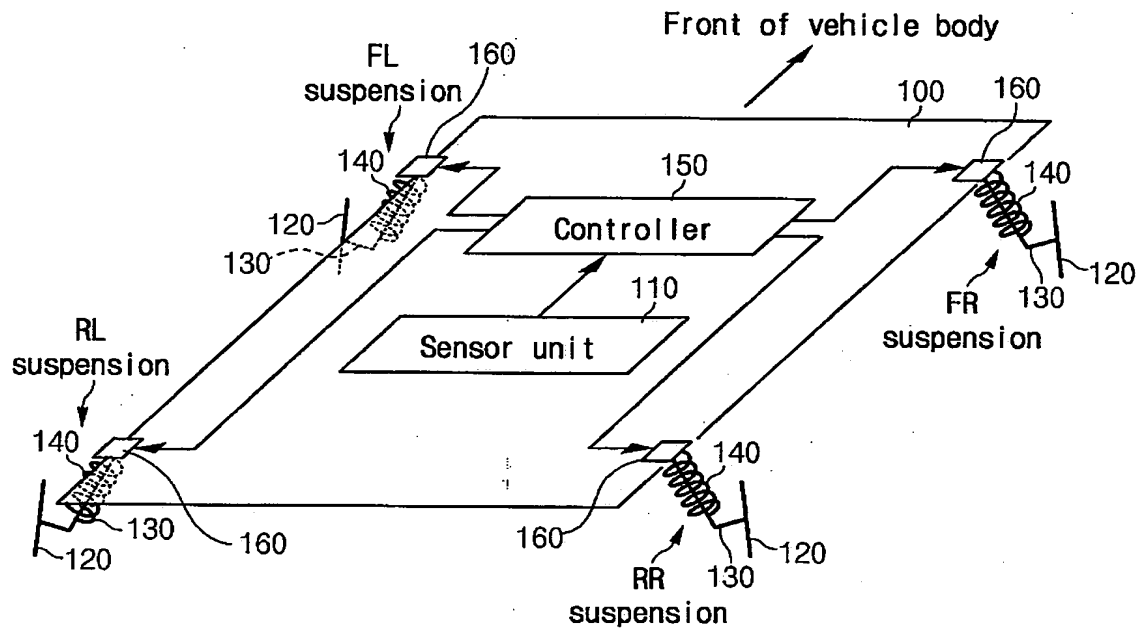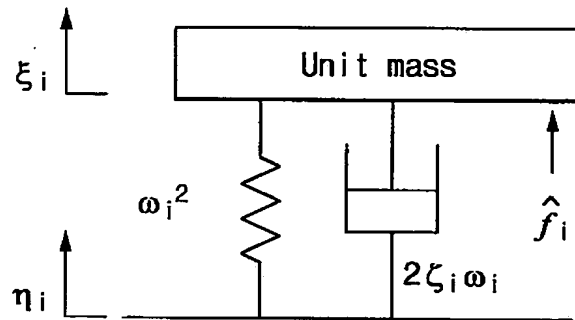# Fig. 1

Fig. 2

(Dynamic model for non-coupled modal equations)

Fig. 3
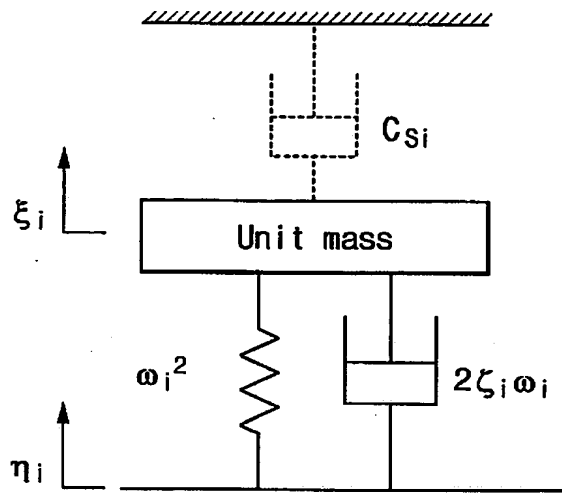
(Dynamic model for a sky-hook modal damper control system)

Fig. 4

Start

Calculate $\dot{x}(t)$ — S410

Calculate $\dot{\xi}(t) = (S^T K S)^{-1}(S^T K)\dot{x}(t)$ — S420

Calculate $f(t) = (S^T P)^{-1}(-C_{Si})\dot{\xi}(t)$ — S430

Apply actuating force $f(t)$ to actuators — S440

End

Fig. 5

(Dynamic model for a sky-hook coulomb
modal friction damper control system)

Fig. 6

```
                    ( Begin )
                        │
                        ▼
        ┌───────────────────────────────┐
        │      Calculate  x˙(t)          │──── S610
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────────┐
        │ Calculate  ξ˙(t) = (SᵀKS)⁻¹(SᵀK)x˙(t) │──── S620
        └───────────────────────────────────┘
                        │
                        ▼
                    ╱S630╲
        Yes    ╱                ╲
     ┌────────  Qᵢⱼ sign(ξ˙ᵢ) ≥ 0 (i=1,...,n)?  ╲
     │        ╲                                  ╱
     │          ╲                              ╱
 S635│                     │ No
     ▼                     ▼
┌─────────┐          ╱S640╲
│ fⱼ = −F_P│      ╱                ╲       Yes
└─────────┘  ───  Qᵢⱼ sign(ξ˙ᵢ) < 0 (i=1,...,n)?  ───┐
     │          ╲                              ╱      │ S645
     │            ╲                          ╱        ▼
     │                   │ No          ┌──────────┐
     │                   ▼             │ fⱼ = −F_N │
     │        ┌──────────────────┐     └──────────┘
     │        │     fⱼ = 0       │──S650     │
     │        └──────────────────┘           │
     │                   │                   │
     │                   ▼◄──────────────────┘
     │   No       ╱S660╲
     └────────  ╱ Calculation is      ╲
               ╲ completed for all j=1,···,p? ╱
                ╲                           ╱
                        │ Yes
                        ▼
        ┌───────────────────────────────────┐
        │ Apply actuating force f(t) to actuators │──S670
        └───────────────────────────────────┘
                        │
                        ▼
                    ( End )
```
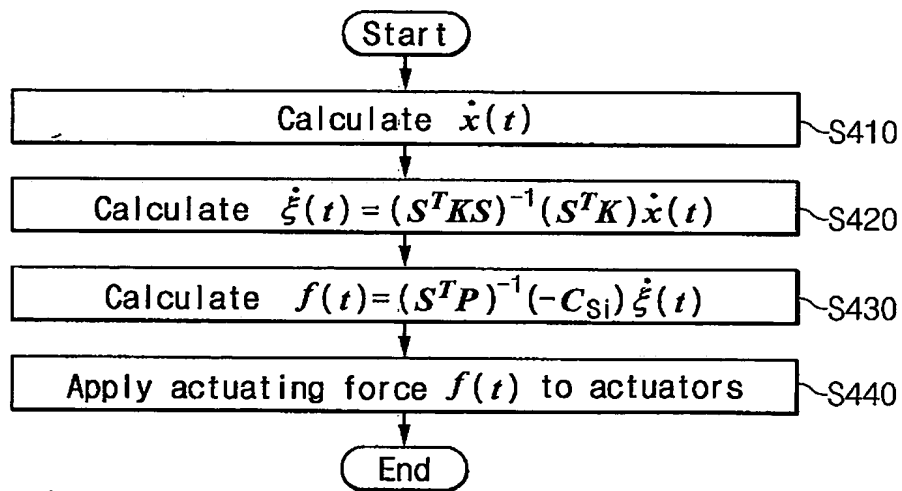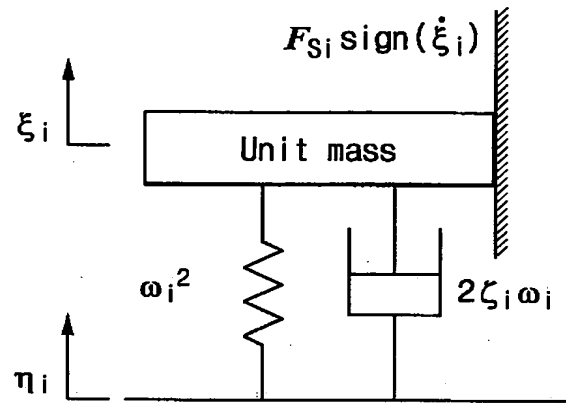
Calculate $\dot{x}(t)$ — S610

Calculate $\dot{\xi}(t) = (S^T K S)^{-1}(S^T K)\dot{x}(t)$ — S620

S630: $Q_{ij}\, sign(\dot{\xi}_i) \geq 0\ (i=1,\ldots,n)$?

S635: $f_j = -F_P$

S640: $Q_{ij}\, sign(\dot{\xi}_i) < 0\ (i=1,\ldots,n)$?

S645: $f_j = -F_N$

S650: $f_j = 0$

S660: Calculation is completed for all j=1,···,p?

S670: Apply actuating force $f(t)$ to actuators